Differential Scanning Calorimetry: Application and Data Interpretation in Pharmaceutical Sciences

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Introduction

High sensitive Differential scanning calorimetry (DSC) is the only technique giving direct thermal properties of macromolecules. Nowadays, DSC gains more roles in the research and industry of pharmacy since new pharmaceutical products come in the forms of proteins or DNA. The DSC results are affected by experimental conditions such as heating scan rate and the nature of drug. This study was aiming to get a feasible clue to interpretation of DSC data.

Methods

Different types of irreversible and reversible models of protein unfolding were modeled using Excel-Solver and the results of the modeled data were compared with experimental data.

Results and Discussion

The results showed that apparent T_m depends on scan rates and nature of protein denaturation. Acquisition of data second derivatives at different scan rates showed various pattern depending on denaturation model.

Conclusion

Calculating the second derivatives of experimental data would be very helpful to select the best protein unfolding model (1).

Keywords

Differential Scanning Calorimetry; Pharmaceutical products; Product Stability; Thermodynamics;

References

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